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# Anaesthetic management of severe dextroscoliosis in a post-covid patient undergoing lumbar fixation and laminectomy

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**ABSTRACT**

**Aim:** Patients who have severe case of kyphoscoliosis face functional and physical difficulties, making anaesthetic treatment challenging. In this example, a severe case of scoliosis was successfully treated under general anaesthesia. The case report aims to highlight the meticulous perioperative management of a patient with severe scoliosis, even after the surgery has been completed. **Case:** A 69-year-old woman with severe dextroscoliosis, single-vessel disease, and a recent history of covid (1 month ago) was scheduled for L1 to S1 fixation with L2-L4 laminectomy. On post-covid chest x-ray, the patient showed lung fibrosis, making anaesthetic management more challenging. **Discussion:** Scoliosis can cause a sort of respiratory restriction. The angle of the malformation is connected to the severity of the pulmonary issue. Cardiovascular, respiratory, and neurological dysfunction caused by the abnormality should be assessed prior to surgery. Fluid shift needs to be monitored carefully and corrected if necessary. There were no issues associated to ocular changes or the biracial plexus. **Conclusion:** Thorough pre-anaesthetic evaluation and optimization of the respiratory and cardiovascular systems is critical. In severe kyphoscoliosis, precise planning of anaesthesia induction and meticulous approach will result in a satisfactory outcome.

**Keywords:** Scoliosis, COVID, and respiratory insufficiency

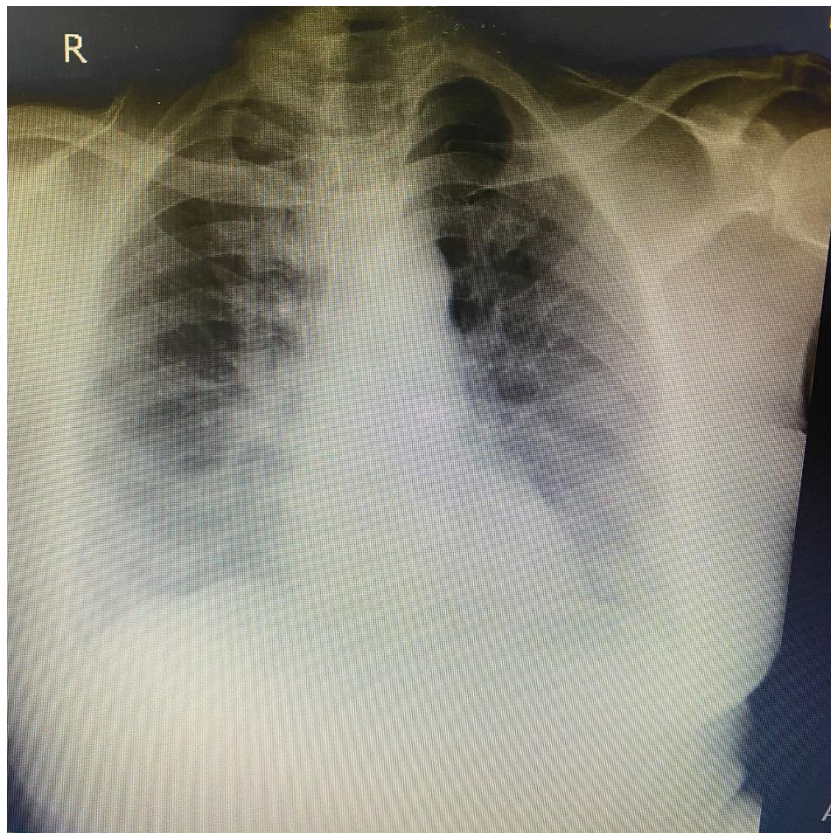
**1. INTRODUCTION**

Scoliosis defined as a side-to-side, and kyphosis from anterior to posterior curvature of the spine, are both involved in kyphoscoliosis (Bansal & Gupta, 2008). Idiopathic, acquired, or postural kyphoscoliosis are all possibilities. This spinal skeletal anomaly has been connected to cardiac and pulmonary dysfunction, which can result in poor cardiopulmonary system performance following surgery. Large fluid shifts, patient posture, and nervous system manipulation are among issues that an anaesthesiologist tackles.

## 2. CASE REPORT

A 69-year-old woman had been suffering from lower back discomfort for ten years and had trouble walking in recent years. She had been suffering from severe dextroscoliosis for ten years and was scheduled for L1 to S1 fixation with L2-L4 laminectomy. A comprehensive pre-operative examination was performed. The patient was alert, cooperative, and underweight and malnourished. Her pulse was 70 beats per minute, her blood pressure was 100/60 mmHg, and she was 156 cm tall and weighed 48 kg. There was no history of tingling in the lower limbs, and no trauma. Mallampati's airway was grade 2 and her room air saturation was 94 percent. The patient had a coronavirus infection a month ago and was recently tested negative. She has also been diagnosed with hypertension for the past four months and is now taking medication for it.

Significant dextroscoliosis deformities in the lumbosacral spine and post covid fibrosis were found on a preoperative chest radiograph (figure1). MRI also indicated the amount of angulation of the spinal column in all directions. Preoperative echocardiography revealed a 50%-60% LAD lesion in the mid LAD with sluggish flow and concluded Single-vessel disease. A preoperative evaluation was performed, and informed consent was obtained. Under general anaesthetic, surgical correction and instrumentation were planned.

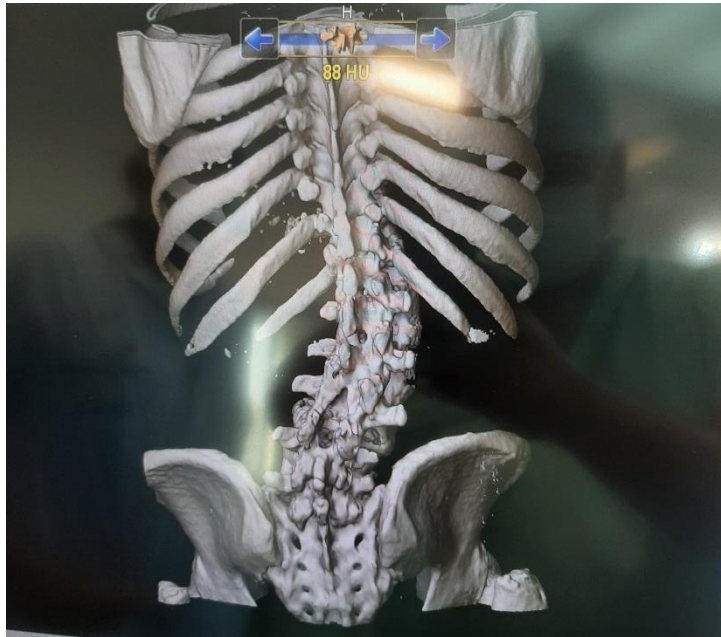


**Figure 1** chest radiograph (anteroposterior view) showing fibrosis of the lungs bilaterally.

All multiparameter monitors were connected when the patient arrived in the operating room. A subclavian central line and a peripheral IV line with 18G were both secure. Hartman solution was used to hydrate the patient. Inj. glycopyrrolate 0.2mg, Inj. Midazolam 1mg, and fentanyl 60mcg were used as premedication. 100 percent oxygen was used for preoxygenation. Injection propofol 80 mg and lidocaine 20 mg were used to induce anaesthesia. After inserting an oropharyngeal airway bag, mask ventilation was performed without difficulty. After establishing that the patient was able to breathe, Vecuronium 6mg IV was administered. The patient was pre-oxygenated with oxygen for 3 minutes. A 7.5 cuffed flexometallic tube was used to intubate the patient, which was positioned at 19 cm from the incisor teeth. Auscultation confirmed bilateral air admission. For invasive BP monitoring and intraoperative ABG, an invasive left radial arterial line was placed. With suitable eye protection, cotton bundles, and gel bolsters, the patient was placed in a prone position. End-tidal carbon dioxide (EtCO<sub>2</sub>), saturation (SpO<sub>2</sub>), invasive blood pressure (IBP), and urine output were all monitored as usual.

The maintenance of anaesthesia was done with a 50:50 mixture of nitrous oxide and oxygen, a 2-3% volume of inhalation agent (sevoflurane), and a maintenance dose of neuromuscular blocking drugs. Patient's saturation was 100 percent, blood pressure was

110/60mmHg, and heart rate was 45-60 beats per minute during surgery. Intraoperative 3D image of dextroscoliosis was taken by navigation (figure 2). Warming blanket and warm fluids helped to prevent intraoperative hypothermia. There were two episodes of bradycardia (HR 40bpm) that were treated with Atropine 0.6mg IV, with a maximum heart rate of 52bpm after atropine administration. A total of 600-700ml of blood was lost. Two blood transfusions were performed, with heart rates ranging from 68 to 74 beats per minute, blood pressure (BP) of 106/68mmHg, and spo2 of 100 percent.



**Figure 2** Intraoperative 3 d image of dextroscoliosis taken by navigation

Laminectomy and spinal fixation were performed (figure 3). The operation lasted more than ten hours. Before the surgery, a 1gm IV injection of paracetamol and a 4mg IV injection of ondansetron were given. The patient was moved to the neuro ICU and given 12 hours of elective postoperative mechanical breathing. Saturation (spo2) on the ventilator was 100%.



**Figure 3** postoperative Xray after surgical correction of dextroscoliosis



### 3. DISCUSSION

Scoliosis is a degenerative spinal condition characterized by lateral vertebral column curvature. Lower lung capacity and thoracic flexibility are frequent in patients with significant spinal anomalies, resulting in increased energy requirements for ventilation. In addition, severe anomalies of the thoracic cage cause a reduction of vital capacity, lung compliance, and tidal volume in people with scoliosis, albeit residual volume and total lung capacity are conserved. Furthermore, the twisted thoracic cage's abnormal mechanical properties increase breathing effort and airway resistance. As a result, people with scoliosis frequently hyperventilate and are more likely to develop respiratory failure, including hypercapnia, hypoxemia, and respiratory acidosis in the case of pulmonary insufficiency (Iwata et al., 2011). The goal of anaesthetic treatment in our case was to maintain respiratory function during the perioperative period. Furthermore, a target-controlled infusion of fentanyl, a short-acting opioid, helps to reduce the dose of sevoflurane while still maintaining anaesthesia depth (Fanelli et al., 2006).

In those with kyphoscoliosis, the degree of pulmonary derangement is proportional to the deformity angle (Bergofsky et al., 1959; Bansal & Gupta, 2008). Cobb's angle more than 60 degrees, according to Weinstein and colleagues, promotes an increase in pulmonary and heart failure (Weinstein et al., 1981). Furthermore, in scoliosis, a loss in pulmonary function corresponds to a decrease in spinal motion (Mellin & Harjula, 1987). In addition to her severe scoliosis, the patient had post-covid lung fibrosis, which made it difficult for her to breathe in normal life, and she had a NYHA (New York Heart Association) rating of IV.

The scoliotic region covered a lower level of the spinal column, from the first lumbar to the first sacral vertebra, and the patient had become acclimated to the abnormality. Most importantly, during the perioperative period, the patient's respiratory function was successfully preserved. With a peripheral oxygen saturation of 97.98 percent, the resistive pressure was frequently maintained between 6 and 8 cmH<sub>2</sub>O. Finally, it is recognized that chest anomalies increase pulmonary vascular resistance by preventing the development of the pulmonary vascular system. Increase in pulmonary vascular resistance results in pulmonary hypertension and, in the worst-case scenario, right heart failure. Although the PA (pulmonary arterial) pressure of this scoliotic patient was not examined or monitored during the intraoperative phase, the preoperative echocardiography revealed single vascular disease.

In the peri-operative period, patients with scoliosis which is severe are more prone to have respiratory and cardiovascular difficulties. As a result, for surgical procedures, a thorough preoperative assessment and careful anaesthetic control are required. This case is presented to demonstrate the careful perioperative therapy of a patient with severe scoliosis, even after the procedure has been completed.

### 4. CONCLUSION

A thorough pre-anaesthetic evaluation and optimization of the respiratory and cardiovascular systems is critical. In severe kyphoscoliosis, careful planning and a diligent approach will yield positive results.

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#### Author Contributions

All authors contributed to the design of the study, as well as data collection and analysis, and the writing of the manuscript. All authors read and approved the final manuscript.

#### Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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#### Conflict of interests

The authors declare that there are no conflicts of interests.

#### Data and materials availability

All data associated with this study are present in the paper.

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